DOCUMENT RESUME

ED 063 391 TM 001 718

TITLE	Occupational Analyst (profess. & kin.) 0-39.85--Technical Report on Standardization of the General Aptitude Test Battery.
INSTITUTION	Manpower Administration (DOL), Washington, D.C. U.S. Training and Employment Service.
REPORT NO	TR-S-205
PUB DATE	Sep 62
NOTE	8p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; *Cutting Scores; Evaluation Criteria; *Job Analysis; Job Applicants; *Job Skills; Norms; Occupational Guidance; Occupational Information; *Personnel Evaluation; Professional Personnel; Test Reliability; Test Validity
IDENTIFIERS	GATB; *General Aptitude Test Battery; Occupational Analyst

ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

ED 063391

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

OCCUPATIONAL ANALYST (profess. & kin.) 0-39.85

B-478
or
S-205

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U. S. Employment Service in
Cooperation with
California, District of Columbia, Michigan
Missouri, New Jersey, North Carolina and
Washington State Employment Services

TM 001 718

September 1962

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

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B-478 or S-205

Summary

The General Aptitude Test Battery, B-1002A, was administered on various dates (from November 1956 to October 1960) to 48 male and 11 female occupational analysts 0-39.85 employed by the United States Employment Service Occupational Analysis Field Centers of California, the District of Columbia, Michigan, Missouri, New Jersey, North Carolina, and Washington. The criterion consisted of supervisory ratings based on a descriptive rating scale. On the basis of mean scores, standard deviations, job analysis data, and their combined selective efficiency, Aptitude G-Intelligence, V-Verbal Aptitude, and S-Spatial Aptitude were selected for inclusion in the test norms.

GATB Norms for Occupational Analyst 0-39.85 B-478 or S-205

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Occupational Analyst 0-39.85

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-478 or S-205

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	115	G	Part 3 Part 4 Part 6	110
V	CB-1-J	115	V	Part 4	115
S	CB-1-F CB-1-H	100	S	Part 6	95

Effectiveness of Norms

The data in Table V indicate that 11 of the 19 "less proficient" workers, or 58 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 58 percent of the "less proficient" workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 28 of the 36 workers who made qualifying test scores, or 78 percent, were regarded as "more proficient" workers.

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Occupational Analyst C-39.85.

II. Sample

The experimental sample consisted of 59 trainees hired for the job of Occupational Analyst by the United States Employment Service Occupational Analysis Field Centers located in California, the District of Columbia, Michigan, Missouri, New Jersey, North Carolina and Washington. The General Aptitude Test Battery, B-1002A, was administered to the sample on various dates, ranging from November 1956 to October 1960. None of the trainees in the sample had previous experience in job analysis. The location, size and sex of the various subsamples are as follows:

Subsample	N and Sex
California	10 (6 male, 4 female)
District of Columbia	13 (9 male, 4 female)
Michigan	2 (2 male, 0 female)
Missouri	6 (6 male, 0 female)
New Jersey	10 (10 male, 0 female)
North Carolina	9 (7 male, 2 female)
Washington	9 (8 male, 1 female)
	59 (48 male, 11 female)

Although different methods were used in the selection of Occupational Analysts by the several Field Centers, the 59 Analysts tend to have similar backgrounds in education, experience, or both. All the individuals in the sample had to pass a merit system examination specifically for Occupational Analyst or for an entry job such as interviewer or employer representative. 74 percent of the total sample are college graduates and all are high school graduates.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (o), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 59

	M	o	Range	r
Age (years)	34.4	9.1	21-63	-.006
Education (years)	15.5	1.2	12-17	.039
Experience (months)	11.7	3.9	5-21	-.135

There are no significant correlations with the criterion for age, education, or experience. This indicates that the sample is suitable for test development purposes with regard to age, education and experience.

III. Job Description

Job Title: Occupational Analyst 0-39.85

Job Summary: Conducts occupational analysis studies of selected industries, subindustries, processes, establishments, and jobs, performing a variety of tasks including technical research, employer contacts and interviews, plant tours, job observation, job classification, and preparation of staffing schedules, job definitions and ratings, reports, and other written materials, as required for the project of revising the Dictionary of Occupational Titles according to procedures specified by the Bureau of Employment Security.

Work Performed: Plans work sequence and organizes material to carry out over-all work assignments. Performs research such as reading textbooks, periodicals, company brochures, and other pertinent data, and contacting industry experts from associations, leading companies, and schools to obtain background information about a particular industry or process. Selects companies in which to conduct job analysis studies, taking into consideration such factors as size of plant, types of jobs, whether plant operates on a jobbing or production basis, and any other factors which may be necessary for complete industry or process coverage.

Contacts plant officials directly or through branch offices. Explains nature of project and requests permission to analyze jobs found in their plant. Prepares plant staffing schedules, obtains information on manufacturing processes, machines and equipment used, and product literature, when available, which will help in writing job definitions. Observes jobs within the plant and confers with workers, foremen, or other plant personnel to determine worker functions and what is required of the worker in a particular occupation.

Writes job definitions for an industry or process from information gathered, following detailed procedures for style and content, and rates or assigns factors significant to the occupation such as physical demands, working conditions, aptitudes, and training time. Integrates jobs into the Occupational Classification Structure. Performs other duties necessary for completing an industry or process study and maintaining records of work completed such as writing narrative reports, compiling industry or process contact lists, and filling out plant control cards.

Reviews completed industry or process definitions with industry personnel, educators, union officials, and other authorities to determine the accuracy of the information prepared on the industry or process.

Prepares reports or works on special projects related to occupational analysis such as correlating ratings with skill levels in certain occupations and studying skills transferability between occupations.

IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the several subsamples during the period November 1956 to October 1960.

V. Criterion

Job performance ratings made by the USES Occupational Analysis Field Center Supervisors on a descriptive rating scale were obtained for each of the subsamples on various dates during 1960 and 1961. The descriptive rating scale was developed by the USES specifically for this study. The rating scale consisted of 15 items, A through O, covering different aspects of job performance considered relevant to the job of occupational analyst. Five alternatives for each item were offered. Weights of one through five, indicating the degree of job proficiency attained, were assigned to the alternatives, making a minimum possible total score of 15 and a maximum possible total score of 75.

The ratings were made in accordance with instructions on USES Form SP-20, "Suggestions to Raters." The first ratings were made only after the Occupational Analysts in the sample had completed a minimum of nine months on the job (with the exception of the three Analysts in the District of Columbia subsample and one Analyst in the State of Washington subsample). After an interval of three weeks the Occupational Analysts in the sample were independently rerated, using the same scale. A correlation coefficient of .937 was obtained between the two sets of ratings. As a result, the two ratings were combined and averaged (and multiplied by ten to eliminate the decimal and to facilitate computation) to obtain the most reliable criterion measure. The possible range of scores for this criterion was 150-750. The actual range for this sample was 305-715, with a mean score of 504.661 and a standard deviation of 90.267.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Intelligence (G) - required for success in planning work and developing research procedures; organizing material; evaluating information in order to make sound judgments and decisions; determing worker functions; and estimating worker requirements.

Verbal Aptitude (V) - rdquired for success in reading, understanding, and interpreting technical data; in writing reports, letters, and job descriptions concisely and clearly; in conducting interviews.

Spatial Aptitude (S) - required for success in understanding job situations and relationship's; to visualize the operation of equipment and the worker's relationship to it.

Clerical Perception (Q) - required for detailed accuracy in copying and altering data from Dictionary of Occupational Titles and other sources of occupational information.

On the basis of the job analysis data, the following aptitudes are considered obviously unimportant for performing the duties of this job and are considered "irrelevant" aptitudes: K-Motor Coordination, F-Finger Dexterity, and M-Manual Dexterity.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. These means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 59

Aptitudes	M	σ	r
G-Intelligence	123.8	9.8	.129
V-Verbal Aptitude	125.5	12.3	-.026
N-Numerical Aptitude	118.3	10.6	-.0001
S-Spatial Aptitude	110.2	18.5	.280*
P-Form Perception	107.3	14.2	.148
Q-Clerical Perception	121.7	15.2	-.054
K-Motor Coordination	115.6	14.0	.043
F-Finger Dexterity	111.3	29.0	.278*
M-Manual Dexterity	114.6	28.8	.419**

**Significant at the .01 level
*Significant at the .05 level

Aptitudes G, V, and Q have the highest mean scores and aptitudes G, V, N, and K have relatively low standard deviations. For a sample of 59 cases, correlations of .334 and .257 are significant at the .01 level and the .05 level of confidence, respectively. Aptitude M correlates significantly with the criterion at the .01 level. Aptitudes S and F correlate significantly with the criterion at the .05 level.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X	X		X		X			
Irrelevant							X	X	X
Relatively High Mean	X	X				X			
Relatively Low Sigma	X	X	X				X		
Significant Correlation with Criterion				X				X	X
Aptitudes to be considered for trial norms	G	V		S		Q			

Trial norms consisting of various combinations of Aptitudes G, V, S and Q with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of G-110, V-115, and S-95 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 32 percent of the sample in the low criterion group because this percent was considered to be the unsatisficatory or marginal workers. (This percent is as close as possible to one-third of the sample.)

Table V shows the relationship between test norms consisting of Aptitudes G, V, and S with critical scores of 110, 115, and 95, respectively, and the dichotomized criterion for Occupational Analyst 0-39.85. Workers in the high criterion group have been designated as "more proficient workers" and those in the low criterion group as "less proficient workers."